CENTRAL INTELLIGENCE AGENCY

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1. The Central Directorate of the Maritime Register (Tsentralnoye Upravleniye Morskogo Registra), CDMR, was a department of the Ministry of the Merchant Fleet, MMF , subordinate to the MMF Minister through (fnu) BAYEV, his Deputy Minister for General Administration. In late 1950, the CDMR Deputy Minister was Engineer-captain, MF Second Rank (fnu) 25X1 ZHIN.

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2. The CDMR was organized as an independent department of MMF sometime during 1922-1923; until that time the Soviet Merchant Fleet used either the English or the German Lloyd's register standards. 25X1

3. The CDMR had a vast scope of activity; it prescribed and published all regulations governing the following functions of MMF:

   a. Shipbuilding

   b. Ship repair 25X1

   c. Technical maintenance of vessels 25X1

4. Although the CDMR was an agency of the MMF, regulations prescribed by this agency were obligatory upon all USSR seagoing vessels, regardless of the ministry to which they belonged, with the exception of Soviet naval vessels. Thus, vessels of the Ministries of the Fishing and of the Shipbuilding Industries, etc., were obligated to comply with CDMR regulations as strictly as did MMF. Even the Soviet Navy, which had an organ parallel in function to CDMR, referred to CDMR on all subjects regulated by this agency.

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(Note: Washington Distribution Indicated By "X"; Field Distribution By "#".)

5. The T/O of the Central Directorate of the Maritime Register was as follows:

a. Technical Operation Section — one chief, five or six senior engineers (hull and machine engineers), six to eight engineers, and two technicians.

b. Shipbuilding and Ship Repair Section -- one chief, five senior engineers, six engineers, and two technicians.

c. Vessel Documentation Section — one chief, two or three senior engineers, four engineers, and two or three technicians.

d. Accounting Office — one senior accountant, one accountant, and one economist.

6. Regional inspectorates of the Maritime Register (lineynyye inspektsii morskogo registra) were located in every maritime port of the USSR. The T/O of such inspectorates varied from three to 15 employees, and included the chief, deputy chief, several senior inspectors and inspector-engineers, several senior inspectors and inspector-engineers for vessel hulls, and one or more accountants. Regional inspectorates of the Maritime Register serviced all agencies of other ministries possessing a fleet. In all respects, these regional inspectorates were subordinate to the Central Directorate of the Maritime Register, even though attached to steamship companies, ports, and shipyards.

7. CDMR prepared the manuals specifying the rules for construction, classification, periodic inspections, maintenance, and the buyer's acceptance of maritime vessels and parts thereof. A list of these manuals follows:

a. Construction Rules and Classification of Maritime Steel Vessels Manual, with chapters on hulls, deck structures, engine-boilers, and propellers.

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b. Construction Rules and Classification of Maritime Wooden-Hulled and Reinforced Concrete Vessels, with the same chapters as those mentioned in paragraph 7a. [redacted] the manufacture of reinforced concrete petroleum shipping barges (with displacements of 1000-2000 tons) started in 1945-1946 at the MMF shipyard in Astrakhan. These barges proved to be uneconomical on long distance trips, however, and were therefore mostly used as stationary vessels (storage of liquid fuel, water, etc.)

c. A signal equipment manual (Pravila Oborudovaniya i Snabzheniya Signalnymi Sredstvami i Instruktsiya po Osvidetelstvovaniye i Priyëmke Signalnogo Oborudovaniya i Signalnykh Sredstv Morskikh Sudov) which was divided into the following subjects: classification of maritime signal equipment and required characteristics, assembly and installation of various signal sets, operational requirements, inspection of signal equipment in plants manufacturing this equipment, and tests of equipment and acceptance procedure on vessels.

d. A loading equipment manual (Pravila Priyëmki i Osvidetelstvovaniya Gruzopodyëmnykh Sredstv na Morskikh Sudakh) with the following topics: types of loading and unloading equipment, installation of this equipment on vessels, inspection of this equipment in manufacturing plants, and tests and acceptance procedure for vessels.

e. An electrical equipment manual (Pravila Osvidetelstvovaniya Elektrooborudovaniya na Morskikh Sudakh) with the same chapters as those mentioned in paragraph 7d.

f. An anchor manual (Pravila Snabzheniya Morskikh Sudov Yakornym Oborudovaniyem i Instruktsiya po Osvidetel'stvovaniyu Yakorey i Yakornykh Tsepey Morskikh Sudov), with the same chapters as mentioned above /see 7d/.

8. CDMR conducted research and published manuals on the following:

a. The required roll amplitude index (Normy Ostoychivosti) of seagoing shallow-water vessels. The basic symbol used to calculate the roll amplitude indexes for class I vessels (seagoing vessels) was, $\lambda$ = 100 (length of wave = 100 m.). For class II vessels (with a 300-mile radius) the symbol $\lambda$ = 60 m. Two other indexes used for the determination of required roll amplitude indexes were:

(1) The heeling moment (Velichina Krenyashchego Momenta ot Vetrovoy Nagruzki). This index was calculated by means of several formulae; the basic one was N = PxS.

(2) The critical angle from the movement of passengers to either port or starboard (Ugol Paniki).

(a) On the upper deck of all passenger vessels the maximum angle was 10 degrees,

(b) On lower decks this angle was from seven to nine degrees,

(c) The critical angle caused by change of course could not exceed four degrees.

b. On the required roll amplitude indexes (Normy Ostoychivosti)for seagoing tugs. The newest indexes were published in 1948, replacing those of 1945. In these indexes the value for $\lambda$ was 60 m. The indexes published in 1948 required a tug to resist the critical tow-angle to a degree calculated by the following equation: m k p (the critical tow angle) = k l f. The symbols in the second half of the equation had the following values:

(1) For tugs with a maximum of 200 hp., "k" = 5.

(2) For tugs with over 200 hp., "k" = 4.

(3) l = the distance from the tow hook to the vessel's gravitational center and was expressed in meters.

(4) "f" = the towing power (tyagovoye usiliye v tonnakh) and varied from 0.01-0.02% of the vessel's indicated horsepower.

Requirements issued in 1948 were based on a heavily increased index "k" (in 1945 "k" was equivalent to 1.2-2.5; in 1948 "k" was equal to 4 to 5). The practical application of this increased requirement to the tugs caused a very poor roll amplitude (Ostoychivost). In order to comply with these new rules it was necessary to use ballast in tugs amounting to 12% of their displacement. New tugs, constructed to comply with 1948 regulations, were rather uneconomical in operation since their weight and draft had to be considerably increased, which resulted in reduced speed and maneuverability. There were many discussions and conferences held in 1949 and 1950 in which resolutions were adopted to request a return to 1945 regulations and to abolish those of 1948. [redacted] 25X1

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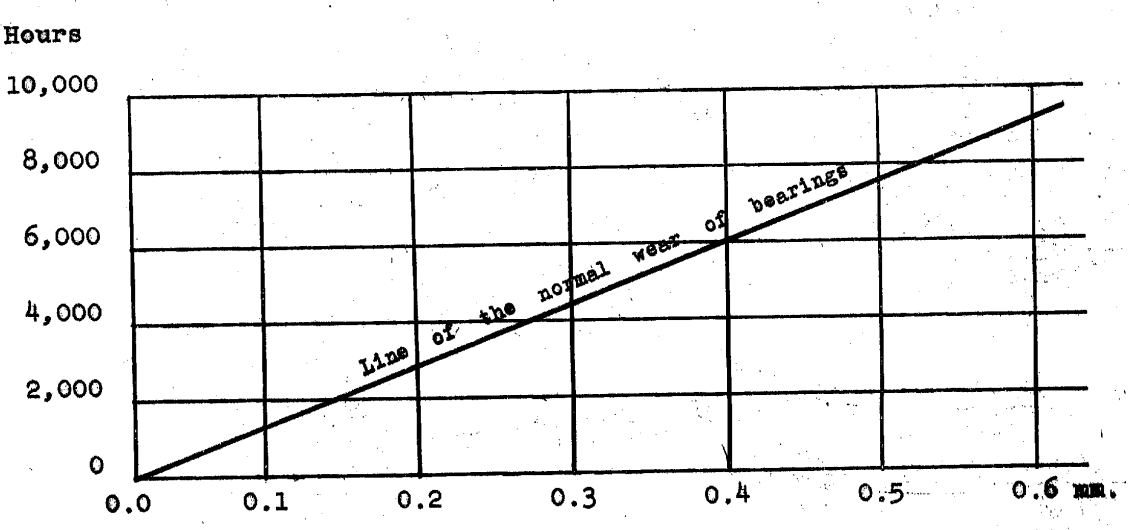
9. The Negative Buoyancy Moment of Maritime Vessels (Instruktsiya po Ustanovleniyu Nepotoplyayemosti Morskikh Sudov) was a CDMR manual, the last edition of which was prepared in 1948. This instruction manual gave the maximum quantities of water which may enter various parts of a ship without causing it to sink. The manual was illustrated with diagrams showing the negative buoyancy moment for the various classes of maritime vessels. These diagrams were often referred to as "differential diagrams" (Differentovochnyy Diagram).

10. CDMR also published a manual governing the examination of machine parts so as to determine their condition and further use. A graphical method of checking machine parts was introduced in 1949, replacing the previous method, which had been based on the periodic gauging of machine parts and the entry of this data on very complicated forms. The results of these periodic inspections and the differences established by comparisons determined whether a particular part had to be overhauled. The forms, however, were so complicated that practically no engineer could interpret them properly. The new method established diagrams for indicating the condition of all main parts of a ship's machinery subject to wear. These diagrams had two components: the hours of operation (normally given in thousands of hours and shown on the diagram's ordinate), and the wear of parts (in millimeters, and indicated on the diagram's abscissa), as is illustrated below.




Proper operation and adequate lubrication of parts would show a straight line of wear on the above diagram; a broken or curved line would reveal poor operational methods and inadequate lubrication.

11. CDMR also standardized the methods of part processing in ship repair yards, and the proper clearances between these parts when assembled. This was a very grave problem, not only in the ship repair industry, but in all industrial branches of the USSR economy, since almost every plant employed different methods and standards, thus making the assembly of parts very difficult. All efforts to standardize part production and clearance standards, however, had thus far failed.

12. Research on, and the introduction of, a method to determine the tension reaction of materials was another CDMR project. According to this method, parts of machinery were covered by a special lacquer, which, when dry, created a thin sensitive coating on the part's surface. These parts were then subjected to various pressure tests which cracked the lacquer coating in lines generally perpendicular to the main direction of stress. The first cracks appearing on the lacquer surface would indicate the critical area of the tested part.

The lacquer used in such tests was required to adhere tightly to the tested material, and crack prior to the moment that this material reached its elastic limit. After 1944, the above method of testing was applied to the various parts of marine diesel engines; after 1948, the method was used to test the parts of boilers and various compressed air containers. This new test was rapidly replacing the older method, which consisted of studying various sample pieces cut out of the tested parts.

13. CDMR conducted research on the torsional oscillations of the propeller shaft (referred to as "resonance") and established standard methods for the installation of propeller shafts (the critical speed of the rotating propeller shaft is the speed at which the torsional oscillations of the shaft coincide with the moment of resonance).

14. CDMR participated in the research and establishment of new technological processes for ship repair installations. Progress in this field had been very slow; 60 per cent of the work done in 1951 in ship repair installations of the Ministry of the Merchant Fleet was done by hand. The main aims of introducing new technological processes into ship repair installations were the following:

a. The research, introduction, and establishment of a systematic, sequential procedure applicable to the disassembly, overhaul, assembly, and installation of machinery and/or the parts thereof.

b. The maximal replacement of manual with machine labor.

c. A greater participation of ship repair yards in ship repair work; i.e., the transfer of the repair work done on ships by regular crews to the ship repair yards, so as to achieve a higher efficiency and better quality of repairs.

d. Standards for part fitting measurement in USSR ship repair yards and shops.

e. A wider adaptation of "shock" work methods favorably tested at ship repair installations.

15. Maritime Register regulations pertaining to the technical operation of vessels included the following points:

a. The authorized time for the shifting of a rudder from one board to the other (full turn) could not exceed 35 seconds, and from the normal position to either port or starboard, no more than 15 seconds.

b. The minimal allowed angle from the rudder's normal position to either board was 35 degrees.

c. The allowed torsion angle of the rudderhead could not be further than seven degrees from the rudder's plate plane.

d. The anchor's lifting speed from the ground to rest position had to be at least eight millimeters per minute.

e. Anchor chains had to be composed of at least three couplings (smychka) of 25 meters each; chains were to be greased with coal lacquer (kuzbasskiy lak).

f. No steel hawsers could be used in stormy weather.

g. All ship cabin doors were to swing open inside the cabins; all other doors opened outside.

h. No carbonic acid fire-extinguishers could be used in the crew's living quarters.

i. Boilers had to be provided with two separate feed valves. In addition, boilers on seagoing vessels were to be provided with steam "injectors".

j. Every boiler had to be provided with at least two water gauges and a complete set of control cocks.

k. When the water level in a boiler fell below the water gauge, the boiler was considered inoperative.

l. No personnel under 18 years of age were authorized to operate ships' machinery and boilers.

m. The cleaning of the boilers' upper scavenging had to be performed at least twice in 24 hours (see page 7).

Sketch of Boiler Scavenging